

Dr Andrew Moorhouse
Dr Trevor Lewis
E/Prof Peter Barry

Membrane Biophysics Laboratory

Ligand-gated ion channels are one of the fundamental building blocks for a functioning nervous system mediating fast synaptic transmission between nerve cells. The current focus of research in the Membrane Biophysics Laboratory is the relationship between the structure and the function of the inhibitory GABA and glycine activated ligand-gated ion channels. These channels are investigated by using a combination of patch clamp recordings from recombinant receptors expressed in cultured cells and molecular biology techniques to introduce specific amino acid mutations. The following honours projects are currently available, although students interested in related projects are encouraged to discuss their ideas with us.

Project 1: Investigating the relative movement of loop structures in the extracellular domain of the glycine receptor. These structures have been implicated in the mechanism that leads to opening of the channel pore following ligand binding.

Project 2: Identification and functional characterization of amino acid residues within the cytoplasmic M3-M4 loop of the glycine receptor. We hypothesise that this region is important in determining both the ion permeation properties and desensitization kinetics of the receptor-channel.

Project 3: Investigating the action of flavonoids, a diverse group of plant-derived compounds, on human glycine receptor channels.

Skills learnt: mammalian cell culture techniques, transient transfection of mammalian cells, whole-cell and single-channel patch clamp electrophysiology, biophysical analysis of ion channel properties, immuno-histochemistry of transfected cells.